VIRTUAL INTERACTIVE TEACHING TECHNOLOGY AND TRAINING BASED ON AI, VAR

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ABSTRACT

The most important aspects of VR were formulated by computer graphics pioneers Ivan Sutherland in 1965 described the idea: Don't think of it as a type of technology that integrates multimedia content. means to convey informational content, but it also allows users to interact with content elements. VR uses computer graphics to create a realistic world without a screen, think of it as a window, a window through which the virtual world can be viewed. The challenge is computer graphics and making virtual worlds look real, sound real, move and react to interactions in real time and even feel real.

Keywords: *Virtual interactive teaching technology, automation teaching, electro-mechatronics teaching technology, VAR, AI.*

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1. INTRODUCTION

People not only need to use but also need to enjoy the beauty of technology products, especially the displayed content is not only transmitted one-way but also has the ability to interact between people. participation and content, between content and form. Today's digital technology products are aiming for increasingly higher conveniences for users. Virtual interactive technology has appeared since the late 60s of the twentieth century and is known for many things. names like virtual environment, virtual space, artificial reality. These technologies are the foundation for the development of virtual interactive technology today [1].

The most important aspects of VR were formulated by computer graphics pioneer Ivan Sutherland in 1965 who described the idea: Don't think of it as a type of technology that integrates multimedia content. to convey informational content, but it also allows users to interact with content elements. VR uses computer graphics to create a realistic world without a screen, think of it as a window, a window through which the virtual world can be viewed. The challenge is computer graphics and making virtual worlds look real, sound real, move and react to interactions in real time and even feel real.

According to him, the task of VR is to simulate a virtual world in which the user realistically gets the impression of being inside a real world, which is called immersion.

Virtual interactive technology is a three-dimensional space, participants can interact with that virtual environment. Furthermore, the artificial world is not static, but changes according to the user's interactive wishes (thanks to actions, words...). This defines a key characteristic of VR, which is real-time interaction. Up to now, this technology has been developed and applied in many fields: military, medical, entertainment, etc.

In Vietnam, a number of recent scientific studies have studied the strengths of TTA teaching in teaching, specifically:

Author Le Huy Hoang has researched virtual practice - application in teaching industrial engineering in grade 12 high school. In this thesis, author Le Huy Hoang has analyzed clearly and in detail the levels of virtual interaction in practical teaching [18].

Author Nguyen Van Huan has researched hair simulation applied in virtual interaction, and written a program to simulate 2D hair and 3D scalp [19]. The thesis can be seen with 2D hair and 3D scalp simulation programs to have a clear and intuitive view in research and application of virtual interactive technology in real biological analysis data.

Author Tran Kim Tuyen has given an overview of teaching technical drawing based on virtual interactive technology at colleges, pointed out some concepts and applications of TTA in teaching and given some teachings. Sample project on teaching technical drawing using virtual interactive teaching technology. However, teaching TTA in this thesis only stops at non-immersive virtual interaction in the form of simulating a 3D program for the technical drawing course [2].

2. CONTENT

2.1. Virtual concept in mathematics

Some concepts of virtuality in the fields of mathematics, physics and science help shed more light on the theory of virtual interactive teaching.

An imaginary number is a complex number that, when squared, results in a negative number. An imaginary number is the product of a real number b with i, where $i_2 = -1$.

Imaginary numbers were first coined in the 17th century and were considered a vague idea with no application in mathematics, only of Gausse's theory [2].

An imaginary number i appears in the complex summation a + bi, where a is a constant constant with the imaginary number i added to the complex part b to form the total complex number.

Virtual concept in physics

In optics, an illusion is an unreal part of multidimensional space that counterbalances real space. An opposite side in the same direction. At this time, information collected from the eyes is processed by the brain to produce sensations that do not coincide with real objects. Optical illusions demonstrate that the human brain when perceiving images can use certain assumptions to speed up information processing but are sometimes inconsistent with reality.

Virtual is a multidimensional space that exists thanks to network and computer interfaces created.

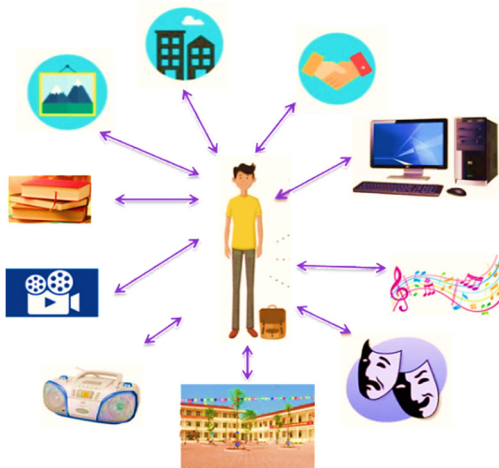## 2.2. Interactive teaching

Fig. 1. Interactive teaching

According to the views of Jean-Marc Denomme' and Madeleine Roy on the concept of interactive pedagogy as follows: "Interactive pedagogy is an approach to teaching activities, especially emphasizing the interrelationships between three factors. learners, teachers and the environment in pedagogical activities".

According to the English - Vietnamese dictionary, "interaction" appears in English as the word "interaction". This is a compound word, made up of two single words: inter and action. In which "Inter" means connection with each other [1] and "Action" means to do something, action, activity. Thus, "interaction" is the interaction between linked relationships and has a two-way impact [2, 3].

According to the open dictionary Online (Open Encyclopedia) Wikipedia, interaction is the action of one object or the action of another object, or an exchange of discussion or exchange between one person and another. Here, the interaction perspective is based on a sociological perspective. Also following this approach,

2.3. Virtual interactive program AI, VAR in teaching

In Unity, we can think of Scenes as individual screens, levels, or regions of game content. For example, Main menu, Options, About...

By building the game with multiple scenes, we will be able to distribute load times and test different parts of the game individually quickly and accurately.
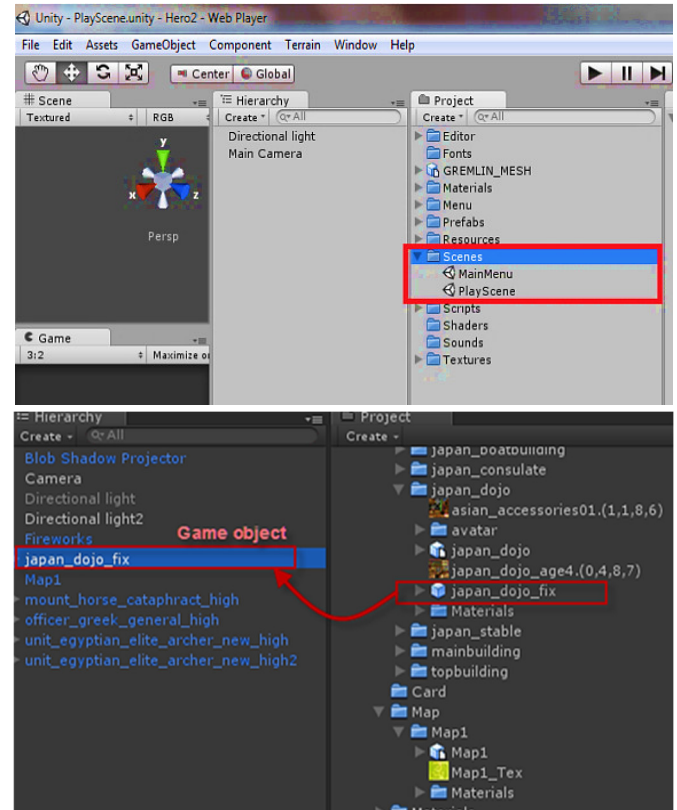

Fig. 2. Unity scenes and drag resources to the Scene to use

- Object program

A resource is used in a scene, then we can consider this resource as a new Object program.

- Components

Components are components in a Unity Program Object. By attaching components to an object, new parts of the engine program can be immediately applied to the object.

- Script

Script is the most important component in Unity, scripts can be seen as the soul of the program. We can script the program using C++, Java Scripts or Boo. According to many people who have used Unity, coding in C++ will help the program run faster and help control the code better because all variables must be clearly declared. On the other hand, C++ language is very convenient for programming, the author used C++ language to write the script for the program. Each C++ script file is a required class that inherits

from the MonoBehaviour class, whose class name must match the script file name.
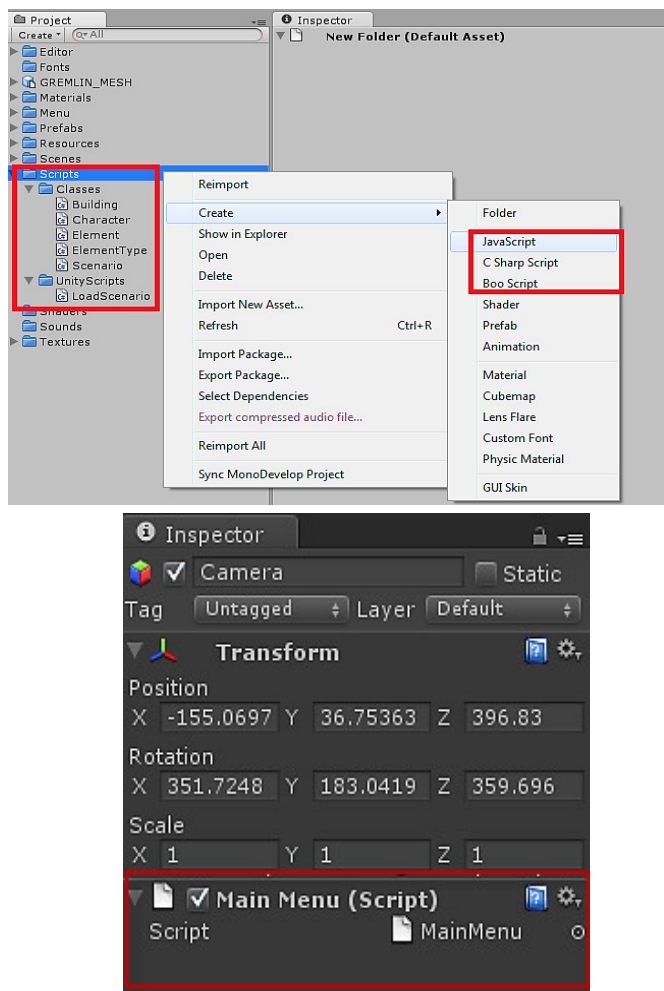

Fig. 3. How to create a new script file and attach it to the object

Start the process

The TTA lesson plan design process includes 6 steps:

Step 1- Determine goals: after students complete the TTA class, what goals will they achieve in terms of skills, attitudes, and knowledge?

Step 2- Choose content: Choose appropriate lecture content to design and build the TTA program.

Step 3- Design a TTA lesson plan: Design a TTA lesson plan including requirements for organizing a TTA class such as teaching media, teaching environment, and implementation time.

Step 4- Prepare a TTA lesson plan: After implementing B1, B2, B3, analyze the teacher's activities and learners' activities corresponding to each TTA teaching content.

Step 5- Evaluation: Re-evaluate the entire TTA lesson plan. If it is not appropriate, go back to step 4 to correct and re-write the lesson plan.

Step 6- Experiment with TTA teaching: The TTA lesson plan is completed and put into practice.

End the process.

2.4. Stages in teaching based on VAR

Phase 1: Virtual interactive teaching phase

The virtual interactive teaching phase is the phase of implementing teaching activities based on phase 1. However, this phase is heavily influenced by the intuition of teachers and learners. And is objectively affected by the virtual interaction device interaction with the experimental object.

Therefore, in this stage there are two decisive factors: people and virtual interactive devices, which are built according to:

During this stage, 3 Steps need to be carried out, Step 1: Theoretical lectures are conducted experimentally, Step 2: Teachers guide students through the TTA program, instructing on how and how to control the sensor system manually. as well as the mode buttons in the TTA program. Step 3: Students interact with the TTA program, students can use Oclus Go glasses for immersive TTA classes and use phones for semi-immersive TTA classes and start using the TTA program. For the Industrial Robotics class, students are allowed to control the Robot arm TTA program at different levels depending on the lesson designed in the preparation phase.

Phase 2: Evaluation and improvement phase

The evaluation and improvement phase is applied to teaching and learning activities according to the following steps:

During the evaluation and improvement phase, 3 Steps are also conducted. Step 1: Evaluate teaching and learning activities, Step 2: Evaluate the learning process, Step 3: Evaluate TTA teaching methods. During this stage, qualitative and quantitative assessment methods are used based on students' learning results after the experiment, collecting students' opinions after studying the experiment, and getting expert opinions. For the Industrial Robotics class, this stage will be presented in detail in chapter 3.

After completing the process of organizing experimental teaching, results will be obtained. Based on that, an assessment will be made on the effectiveness of TTA teaching methods.

End of the TTA teaching organization process.

3. CONCLUSION

Propose a process for virtual interactive teaching, propose a process for virtual interactive teaching, propose a process for building virtual interactive teaching to support the implementation of virtual interactive teaching plans before organizing experimental teaching function (detailed in chapter 3).

To bring an engaging feeling to students when studying TTA, a virtual interactive program has been built with a full wing of programming and 3D links. Communicate to get suitable results with the Robot hand, the learning program in practice ensures aesthetics and sophistication in design details.

In building the TTA program for the Industrial Robotics module, in addition to designing the 3D block of the Robot arm, but so that the Robot arm can move as desired, we have written code for a virtual interactive program for the Industrial Robotics module. The program uses Oclus Go and phone. Building the program code to meet the appropriate requirements for the course is very elaborate on both Oclus Go glasses to meet immersive TTA teaching and on phones to meet semi-immersive TTA teaching.

For TTA teaching methods, it depends a lot on the teaching environment, including factors about facilities and teachers. To effectively carry out the experimental class presented in chapter 3. Provides conditions for organizing classes using TTA teaching methods for the Industrial Robotics module.

Analyzing and designing new systems to support teaching and learning, such as: building the process of designing TTA lessons, and designing the TTA program in teaching. This design makes it more convenient for teachers in the process of applying TTA teaching in practice**.**

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